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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of:)	PATENT
)	
Bertil LARSSON et al.)	Group: 2834
)	
Serial No: 09/297,606)	Examiner: Perez, G.
)	
Filed: June 18, 1999)	Att. Docket No.: 66291-137
)	

A STATOR FOR A ROTATING ELECTRIC MACHINE
AND A METHOD OF MANUFACTURING A STATOR

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RESPONSE TO OFFICE ACTION

Washington, D.C.
4/19/2002

Assistant Commissioner for Patents
Washington, D.C. 20231

Sir:

In response to the Office Action of October 29, 2001, Applicants have the following comments:

REMARKS

This is in response to the Office Action of October 29, 2001, in which the Examiner rejected the claims as unpatentable over Huang et al. or Takeuchi et al. in view of Nikitin, Elton '165, Redfern, Penczynski et al., Breitenbach et al. and Rieber et al., Evans, Lashey and Beck.

The Examiner asserts that Takeuchi discloses a method for manufacturing a stator for a high voltage rotating machine. However, the Examiner asserts that Takeuchi does not disclose the

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provision of magnetically permeable high voltage electric field confining cable. The Examiner, however, asserts that Nikitin discloses such a structure.

With respect to the apparatus claims, the Examiner rejects claim 1 over Huang in view of Nikitin and Elton. The Examiner asserts that Huang does not disclose that the winding comprises a cable with an electric field confining covering. The Examiner, however, asserts that Nikitin discloses a high voltage stator with windings comprising a high voltage cable, and Elton discloses a cable with a magnetically permeable electric field confining insulating covering. Thus, according to the Examiner, it would have been obvious to modify the machine of Huang with the high voltage cable of Nikitin and Elton.

The Examiner has cited a number of secondary references. However, Applicants believe that the primary references, namely, Takeuchi et al., Huang et al., and Nikitin and Elton et al. do not support the rejections and the discussion hereinafter is primarily directed to these references.

Takeuchi et al. is not a high voltage machine. It is a conventional low voltage machine having a conventional stator, that is a stator wound with a thin insulated wire. There is nothing in Takeuchi which would suggest that it should operate at a high voltage because Takeuchi is specifically designed for low voltage operation. The background of Takeuchi discusses the use of highly efficient motors as, for example, servo motors in a robot. These are not high voltage machines. Notwithstanding the fact that Takeuchi is silent as to the voltage levels, Applicants assert that conventional machines such as Takeuchi do not operate at high voltages, as contemplated by the present invention. Perhaps this is why the Examiner cites Nikitin.

Likewise, Huang et al. is not a high voltage machine. Huang illustrates a stator core for a high power density electric motor and generator. High power density is not the same as high voltage. In a conventional high power machine, the current is elevated and the voltage is relatively

low. High power is achieved because the product of the voltage and the current provides a measure of the power output. In a high voltage machine, the voltage is elevated. The Huang machine is not designed for high voltage. It is a conventional machine operating at high current levels.

Nikitin does not describe the invention as claimed. Nikitin employs a slotted core, a dielectric oil separator cylinder next to the internal surface of the core and a winding composed of two series connected half windings in the winding slots which are located in the insulation sleeves and which are hollow projections filled with a thermo-setting compound. Nikitin does not disclose a flexible, high voltage, electric field confining cable. Nikitin merely discloses a machine having circular conductors which when thermo-set are not flexible or capable of threading through stator slots. This is why the specification of Nikitin calls for a winding composed of two series connected half windings. Nikitin allegedly operates at high voltage; however, the alleged high voltage elements of Nikitin comprise these two half windings in the slotted part of the stator which are placed in the insulation sleeves which have hollow projections on the internal surfaces. The part of each insulation sleeve which extends beyond the slotted part of the stator has a cylindrical portion integral with a cone shaped cable type termination reinforced with current carrying layers. Nikitin does not employ a flexible cable which can be bent without damage as in the present invention. *See, for example*, claim 11. The mere fact that Nikitin mentions a cable type termination does not mean that Nikitin is employing a cable as the operative element. Nikitin is simply using a termination which might be useful with a cable because the winding in Nikitin is round. However, it is believed that the winding in Nikitin is no different than a rigid bar type winding in a conventional machine. Indeed, a thermosetting material would, by definition, be rigid. Because Nikitin's structure calls for placing between the hollow projections is a thermosetting compound the resultant cable is not threadable nor is it insulated very far into the end winding region. The Nikitin

winding is required to be insulated with oil in the end winding region, whereas the present invention employs a solid insulation as part of its structure.

It would not be possible to manufacture the machine of Takeuchi with the winding components of Nikitin. Takeuchi is a machine which is wound with a flexible insulated wire which is formed around the stator teeth in a conventional way, *i.e.*, it is wound. Takeuchi, on the other hand, employs rigid sections which are assembled not by winding, but by a process whereby individual rigid sections of the winding are individually located in the stator and then the end winding portions are manually connected in a way which is not unlike a conventional machine having rigid convoluted end windings. Thus, it is believed that there is no motivation to employ the rigid conductors of Nikitin in the machine of Takeuchi.

Elton '165 discloses a cable. However, it must be understood that Elton '165 is a division of a parent application, Elton '565, which discloses the use of pyrolyzed glass tape which is employed (1) in a conventional electric machine using rigid bars, (2) a conventional cable and (3) in a conventional insulated housing. There is no suggestion whatsoever that the cable of Elton (Fig. 7) could be used as a winding in an electric machine. The disclosures in Elton '565 are separate and distinct. Elton '165 is simply a divisional application in which the Abstract from the parent application was duplicated. However, Elton '565 clearly distinguishes the various applications of the pyrolyzed glass material and does not suggest any interchangeability among the applications.

In this connection, high power density is achieved in conventional machines by increasing current. The technology focuses on thermal considerations. The invention goes the other way, *i.e.*, the invention achieves high power by increasing the voltage, thereby reducing the thermal considerations. However, said considerations are not ignored. A power cable operates in free space

and thermal problems are minimal. In a machine, the space is confined and thermal problems are significant. Therefore, one does not simply substitute a cable built for power transmission and distribution for a winding in a machine. Such a substitution would not be obvious or even considered by one of ordinary skill in the art, without careful modification. Applicants do not disagree with the Examiner's assertion that Elton '165 states for one of its purposes avoiding the development of corona discharge. However, the arrangement in Elton '165 would not operate at high voltage in a machine. The cable structure in Elton is rigid or semi-rigid and if it were to be bent so that it could be threaded in a machine, the semiconducting layer formed of pyrolyzed glass tape would crack, which in turn would develop sites for corona discharge at high voltage. .

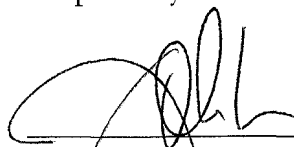
It is believed that the independent claims are allowable over the references cited. The dependent claims likewise are therefore believed allowable over the cited references. A discussion of the secondary references is set forth in the previous response and additional comments are not believed necessary at this time.

It is submitted that the Examiner has not shown a high voltage machine that one of ordinary skill in the art would think it to be successful, nor has the Examiner shown individual operative components of such a machine, and finally the Examiner has not shown why there is a motivation within the references or by those skilled in the art to combine the elements of the references which have been uncovered.

In view of the foregoing, it is therefore respectfully requested that the Examiner reconsider his rejection of the claims, the allowance of which is earnestly solicited.

If filing this paper or any accompanying papers necessitates additional fees not otherwise provided for, the undersigned authorizes the Commissioner to deduct such additional fees from Deposit Account No. 04-2223.

Respectfully submitted,



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